The Gaia-ESO Survey astrophysical calibration

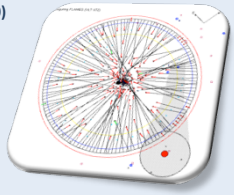
By E. Pancino on behalf of the GES collaboration

FLAMES@VLT

132 GIRAFFE fibers (R≈20000)
- 20-30 fibers on the sky
- the remaining fibers on MW stars and OC
- Hot OC stars: HR3 (403-420 nm), HR5A (434-459 nm), HR6 (454-476 nm), HR14A (631-670 nm)
- Cool OC stars: HR9B (514-535 nm), HR15N (647-679 nm)
- Field stars: HR10 (534-652 nm), HR21 (848-900 nm)

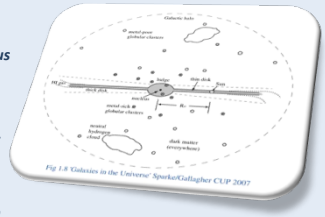
8 UVES fibers (R≈47000)
- 1-2 fibers on the sky
- 6-7 fibers on stars
- Hot stars: setup 520 (414-621 nm)
- Cool stars: setup 580 (476-684 nm)

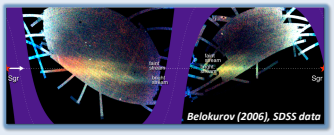
Field of view ≈20'



The Gaia-ESO Survey (GES)

"Gaia-ESO is a public spectroscopic survey, targeting ≥ 10^5 stars, systematically covering all major components of the Milky Way, from halo to star forming regions, providing the first homogeneous overview of the distributions of kinematics and elemental abundances. This alone will revolutionise knowledge of Galactic and stellar evolution: when combined with Gaia astrometry the survey will quantify the formation history and evolution of young, mature and ancient Galactic populations. With well-defined samples, we will survey the bulge, thick and thin discs and halo components, and open star clusters of all ages and masses. The FLAMES spectra will: quantify individual elemental abundances in each star; yield precise radial velocities for a 4-D kinematic phase-space; map kinematic gradients and abundance - phase-space structure throughout the Galaxy; follow the formation, evolution and dissolution of open clusters as they populate the disc, and provide a legacy dataset that adds enormous value to the Gaia mission and ongoing ESO imaging surveys."





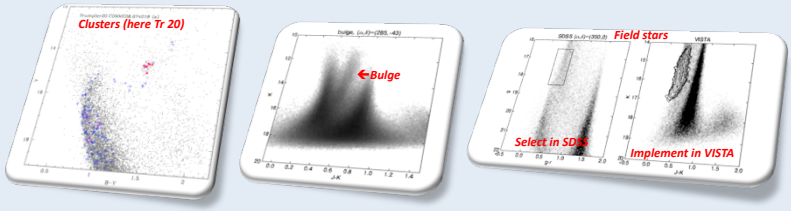
GES Numbers

- More than 300 co-authors in Europe (but not only)
- 240 (+60) awarded nights at the ESO VLT
- ≈15 abundance analysis teams (nodes)
- Observations started: 31 December 2011
- Semestral data releases (reduced spectra, Vr, ...)
- Annual data releases (abundance analysis...)
- Final data release (reprocessed data, ancillary data ...)

- ≈10^5 stars at R≈20000
- ≈10^4 stars at R≈47000
- Magnitude range: 9<V<19 (V>17 only radial velocity)

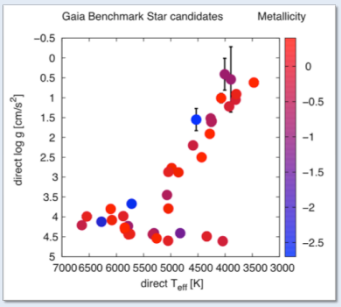
- Open Clusters: 100 of all ages (except embedded)
- Solar neighborhood: ≈5000 stars (UVES, R≈47000)
- Galactic bulge: ≈10000 red clump stars
- MW discs: (both thin and thick) a few thousand stars
- Galactic halo: many thousands of stars (streams-relics)

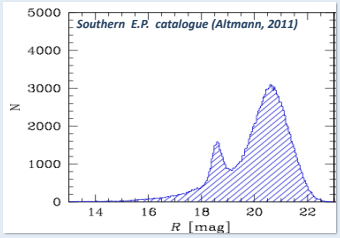
Selection strategies



Observations are restricted to +10° ≥ DEC ≥ −60° whenever possible to minimise airmass limits. The primary source catalog for field stars is VISTA imaging, ensuring excellent recent astrometry, and adding maximal value to the VISTA surveys. The open clusters have mostly been selected from the Dias et al. (2002, A&A 389, 871 -2010 version) and Kharchenko et al. (2005, A&A 440, 403) catalogues, and the WEBDA database [http://www.univie.ac.at/webda]. Only clusters with excellent available photometry and astrometry, and adequate membership information, have been selected. All relevant (public) archival data will be processed as well.

GES astrophysical calibrations





Link with Gaia:

- Gaia Benchmark stars, 40 stars with measured radii, known parallaxes, and bolometric fluxes, that will also be used to calibrate Gaia classifications and parametrization algorithms
- Southern Ecliptic Pole, 100-200 stars observed with FLAMES around SEP, a region that Gaia will scan in the first two weeks of operations

Internal calibration:

- Evans clusters: NGC 3293, 6611, 4755, contain stars of types O, B, A, F, even G, providing a link between hot (down to A type) and cool (up to A type) stars analysis methods.
- Nearby OC and GGC: both giants and dwarfs can be observed simultaneously in these clusters, and PMS stars as well
- Peculiar stars templates: a list of C-stars, CH-stars, s-stars, and other peculiar types that might fall in our selection windows, to test our methods and be sure that we pick them up.

External calibration:

- Famous OC and GCC: well known objects, in common with other large spectroscopic surveys (HERMES, APOGEE, RAVE, ...), spanning a large range in metallicity
- Equatorial calibration fields: eight equatorial fields containing a mix of calibrating objects, designed to calibrate wide field spectroscopic surveys. The first two are on the corot fields